



Designation: F3323 – 19

Standard Terminology for Exoskeletons and Exosuits¹

This standard is issued under the fixed designation F3323; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This terminology covers terms associated with exoskeletons and exosuits. By providing a common and consistent lexicon, the purpose of this terminology is to facilitate communication between individuals who may be involved in the research, design, deployment, and use of exoskeletons and exosuits in applications, including but not limited to industrial, military, emergency response, recreational, and medical areas.

1.2 For the terminology to be harmonious with the practices in the fields, definitions have been drawn from other standards, the literature, or other public sources when possible. When no definition is available, is similar but requires change for use within standards produced by Committee F48, or in dispute, a consensus-based approach will be used to resolve definitions and add them to the lexicon. The development of this terminology is taking place in close coordination with corresponding efforts in all Committee F48 subcommittees to ensure comprehensive and consistent coverage.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

F3200 [Terminology for Driverless Automatic Guided Industrial Vehicles](#)

¹ This terminology is under the jurisdiction of ASTM Committee F48 on Exoskeletons and Exosuits and is the direct responsibility of Subcommittee F48.91 on Terminology.

Current edition approved April 1, 2019. Published April 2019. Originally approved in 2018. Last previous edition approved in 2018 as F3323 – 18. DOI: 10.1520/F3323-19.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

2.2 Other Standards:

ISO 8373:2012 [Robots and Robotic Devices—Vocabulary](#)³
MIL-HDBK-1908:1995 [Definitions of Human Factors Terms](#)⁴

IEC 60601-1-8:2012 [Medical electrical equipment – Part 1–8: General requirements for basic safety and essential performance – Collateral standard: General requirements, tests and guidance for alarm systems in medical electrical equipment and medical electrical systems](#)

3. Terminology

activity—execution of a task or action by a user or their exoskeleton or exosuit, or both.

adaptive control, *n*—control scheme whereby the control system parameters are adjusted from conditions detected during the process. **ISO 8373:2012**

alarm condition—state of the alarm system when it has determined that a potential or actual hazardous situation exists for which operator or user awareness or response is required.

DISCUSSION—An alarm condition can be invalid, that is, a false positive alarm condition.

DISCUSSION—An alarm condition can be missed, that is, a false negative alarm condition. **IEC 60601-1-8:2012**

anthropometric dimensions—measured dimensions that describe the size and shape of the human body. These dimensions are often presented in the form of summary statistics that describe the range of body dimensions that are observed in a population. **MIL-HDBK-1908 11 December 1995**

exoskeleton—wearable device that augments, enables, assists, and/or enhances physical activity through mechanical interaction with the body.

DISCUSSION—An exoskeleton may include rigid or soft components, or both (see exosuit).

³ Available from International Organization for Standardization (ISO), ISO Central Secretariat, BIBC II, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland, <http://www.iso.org>.

⁴ Available from U.S. Government Printing Office, Superintendent of Documents, 732 N. Capitol St., NW, Washington, DC 20401-0001, <http://www.access.gpo.gov>.